

Ms. Anne Heighway
Indianapolis Power & Light Company
1230 West Morris Street
Indianapolis, Indiana 46221

Re: Registered Construction and Operation
Status, 4625 Massachusetts Avenue
(Brookwood Substation) R097-12034-00385

Dear Ms. Heighway:

The application from Indianapolis Power & Light Company (IPL), received on March 14, 2000, has been reviewed. Based on the data submitted and the provisions in IAPCB Regulation 2 (Permits) and state regulations 326 IAC 2-5.1-2, it has been determined that the following generators, to be located at Brookwood Substation, 4625 Massachusetts Avenue, Indianapolis, Indiana, are classified as registered as of the date of this letter. This Registration shall expire September 30, 2000.

- (a) Five (5) Cummins diesel fired portable generators identified as Emission Unit ID C1, C2, C3, C4 and C5. Each generator is an internal combustion engine rated at 1000 kilowatts or 1350 brake horsepower with a maximum hourly diesel fuel consumption rate of 64.6 gallons per hour. With a contractually obligated maximum annual leased engine operating hours for each engine of 225 hours per year.
- (b) Five (5) Cummins diesel fired portable generators identified as Emission Unit ID C6, C7, C8, C9 and C10. Each generator is an internal combustion engine rated at 750 kilowatts or 1030 brake horsepower with a maximum hourly diesel fuel consumption rate of 51.9 gallons per hour. With a contractually obligated maximum annual leased engine operating hours for each engine of 225 hours per year.

The following conditions shall be applicable:

- 1. Pursuant to IAPCB Regulation 5-1-2 (Smoke and Other Visible Emissions) and 326 IAC 5-1-2 (Opacity Limitations) except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following:
 - (a) Opacity shall not exceed an average of thirty percent (30%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.
 - (b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of 15 minutes (60 readings) in a 6-hour period as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor in a six (6) hour period.

2. Each generator shall be equipped with a Diehl 120 volt timer, 60 hertz timer on the output side of each generator. The timer shall operate anytime the associated generator operates. The timer shall be powered by the associated generator and record the cumulative run time (hours and minutes) for each unit. Each timer shall be programmed by Cummins Mid-States personnel prior to delivery and allow the associated generator to operate up to the specified number of hours of 225. Once the number of hours are reached, the timer contacts shall close and the associated generator shall cease operation. Each timer shall be located on a locked cabinet that can only be accessed by Cummins Mid-State personnel.
3. IPL shall arrange, through Cummins Mid-State, for access for personnel from Environmental Resources Management Division and the Office of Air Management to inspect the Diehl timer and the associated generator to verify cumulative run time. In addition, IPL shall notify ERMD at least two (2) business days before the generators will be removed from the site approved in this registration to allow a final inspection of the Diehl timers and the associated generator.
4. Pursuant to IAPCB Regulation 2-6 (Annual emission statement rule) and state regulation 326 IAC 2-6 (Emission Reporting), an authorized individual shall provide an annual emission statement to the Environmental Resources Management Division and the Office of Air Management at the addresses listed below no later than April 15, 2001.

Technical Support and Modeling

Office of Air Management

100 North Senate Avenue

P.O. Box 6015

Indianapolis, Indiana 46206-6015

and

Environmental Resources Management Division

Air Quality Management Section, Compliance Data Group

2700 South Belmont Avenue

Indianapolis, Indiana 46221-2097

5. Pursuant to IAPCB Regulation 2 (Permits) and state regulation 326 IAC 2-5.1-2(f)(3), an authorized individual shall provide an annual notice to the Environmental Resources Management Division and the Office of Air Management that the source is in compliance with this registration at the addresses listed below, in the format attached, no later than April 15, 2001.

Compliance Data Section

Office of Air Management

100 North Senate Avenue

P.O. Box 6015

Indianapolis, IN 46206-6015

and

Environmental Resources Management Division

Air Quality Management Section, Compliance Data Group

**2700 South Belmont Avenue
Indianapolis, Indiana 46221-2097**

This registration is the first air approval issued to this source. The source may operate according to IAPCB Regulation 2 (Permits) and state regulation 326 IAC 2-5.5.

Sincerely,

David S. Foster
Project Manager
Environmental Resources Management Division

Sincerely,

Mona A. Salem
Chief Operating Officer
Department of Public Works
City of Indianapolis

df

enclosures

cc w/enclosures:

Mark Caraher, Permits Program Manager
Matt Mosier, Compliance Program Manager
Cheryl Carlson, Enforcement Program Manager
Mindy Hahn, IDEM
Gail McGarrity, IDEM

Registration Annual Notification

This form should be used to comply with the notification requirements under IAPCB Regulation 2 (Permits) and 326 IAC 2-5.1-2(f)(3).

Company Name:	Indianapolis Power & Light Company (Brookwood Substation)
Address:	1230 West Morris Street (4625 Massachusetts Avenue)
City:	Indianapolis, IN 46221
Authorized individual:	
Phone #:	
Registration #:	R097-12034-00385

I hereby certify that Indianapolis Power & Light Company is in compliance with the requirements of Registration **R097-12034-00385**.

Name (typed):
Title:
Signature:
Date:

Indianapolis Environmental Resources Management Division Air Quality Management Section

and

Indiana Department of Environmental Management Office of Air Management

Technical Support Document (TSD) for a Registration

Source Background and Description

Source Name: Indianapolis Power & Light Company
Source Location: Brookwood Station - 4625 Massachusetts Avenue, Indianapolis, IN
County: Marion
Registration No.: R097-12034-00385
SIC: 4911
Permit Reviewer: David Foster

The City of Indianapolis Environmental Resources Management Division (ERMD) has reviewed an application received from Indianapolis Power & Light Company on March 13, 2000 relating to the operation of portable diesel generators at the above referenced location under a Standard Industrial Classification Code (SIC) of 4911 (establishments engaged in the generation, transmission, and/or distribution of electric energy for sale).

New Emission Units and Pollution Control Equipment

The source consists of the following emission units and pollution control devices:

- (a) Five (5) Cummins diesel fired portable generators identified as Emission Unit ID C1, C2, C3, C4 and C5. Each generator is an internal combustion engine rated at 1000 kilowatts or 1350 brake horsepower with a maximum hourly diesel fuel consumption rate of 64.6 gallons per hour. With a contractually obligated maximum annual leased engine operating hours for each engine of 225 hours per year.
- (b) Five (5) Cummins diesel fired portable generators identified as Emission Unit ID C6, C7, C8, C9 and C10. Each generator is an internal combustion engine rated at 750 kilowatts or 1030 brake horsepower with a maximum hourly diesel fuel consumption rate of 51.9 gallons per hour. With a contractually obligated maximum annual leased engine operating hours for each engine of 225 hours per year.

Unpermitted Emission Units and Pollution Control Equipment

There are no previously unpermitted facilities operating at this source during this review process.

Existing Approvals

There are no approvals previously issued to this source operating at this source during this review process.

Air Pollution Control Justification as an Integral Part of the Process

The company has submitted the following justification such that the timers be considered as an integral part of the generators:

- (a) The amount of hours each generator can be operated will be governed by an operating agreement between Cummins Mid-States, the supplier of the leased generators, and Indianapolis Power & Light, the operator of the generators.
- (b) As part of that operating agreement, Cummins Mid-States will place a Diehl 120volt, 60 hertz timer on the output side of each generator.
- (c) The timer will be powered by the associated generator and record the cumulative run time (hours and minutes) for each unit.
- (d) Each timer will be programmed by Cummins Mid-States personnel prior to delivery to allow the associated generator to operate up to a specified number of hours.
- (e) Once the specified number of hours is reached, the contacts on the timer will close and the generator will cease operation.
- (f) Each timer will be located in a locked cabinet that can only be accessed by Cummins Mid-States personnel.

IDEM, OAM and ERMD have evaluated the justifications and agreed that the timers will be considered as an integral part of the generators. Therefore, the permitting level will be determined using the potential to emit after the timers. Operating conditions in the proposed permit will specify that the timers shall operate at all times when the generator is in operation.

Stack Summary

Stack ID	Operation	Height (feet)	Diameter* (Inches)	Flow Rate (acfm)	Temperature (°F)
C1	Generator	13.5	26.2	8400	860
C2	Generator	13.5	26.2	8400	860
C3	Generator	13.5	26.2	8400	860
C4	Generator	13.5	26.2	8400	860
C5	Generator	13.5	26.2	8400	860
C6	Generator	13.5	26.2	8400	860
C7	Generator	13.5	26.2	8400	860
C8	Generator	13.5	26.2	8400	860
C9	Generator	13.5	26.2	8400	860
C10	Generator	13.5	26.2	8400	860

* Effective Diameter

Given: 2 stacks of 18.5 inches diameter each

Determine individual stack areas:

$$3.142 \times (18.50 \text{ inches}/2)^2 = 3.142 \times 85.56 \text{ inches radius} = 268.8 \text{ sq. inches area}$$

Determine total stack area:

$$268.8 \text{ sq. inches area} + 268.8 \text{ sq. inches area} = 537.6 \text{ sq. inches total area}$$

Determine effective stack radius:

$$537.6 \text{ sq. inches total area}/3.142 = \text{square route of } 171.1 \text{ sq. inches} = 13.08 \text{ inches radius}$$

Determine effective stack diameter:

$$13.08 \text{ inches radius} \times 2 = 26.16 \text{ inches diameter}$$

Enforcement Issue

There are no enforcement actions pending.

Recommendation

The staff recommends to the Administrator that the operation be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

An application for the purposes of this review was received on March 13, 2000, with additional information received on March 16, 22 and 27, 2000.

Emission Calculations

See Appendix A of this document for detailed emissions calculations. Appendix A, Page 3 of 5 shows that manufacturer's emission estimates coincide with AP-42 emission factors except that manufacturer supplied NO_x emission factors are slightly higher. As a result, manufacturer emission estimates were used to determine potential to emit.

Potential To Emit

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as "the maximum capacity of a stationary source or emissions unit to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U. S. EPA, the department, or the appropriate local air pollution control agency."

Pollutant	Potential To Emit (tons/year)*
PM	0.9
PM-10	0.9
SO ₂	0.5
VOC	0.6
CO	1.9
NO _x	24.4
HAP's	Potential To Emit (tons/year)*
Combination	1.35E-02
TOTAL	1.35E-02

*based on 225 hours/yr operation

- (a) This source is **not** a major stationary source because no attainment regulated pollutant is emitted at a rate of 250 tons per year or more, and it is not in one of the 28 listed source categories. Therefore the requirements of 326 IAC 2-5 apply.
- (b) Fugitive Emissions
Since this type of operation is not one of the twenty-eight (28) listed source categories under 326 IAC 2-2 and since there are no applicable New Source Performance Standards that were in effect on August 7, 1980, the fugitive particulate matter (PM) and volatile organic compound (VOC) emissions are not counted toward determination of PSD and Emission Offset applicability.

Actual Emissions

Because this source is a new Registration, no previous actual emission data from this source was required to be submitted or was received.

County Attainment Status

The source is located in Marion County.

Pollutant	Status
PM-10	attainment
SO ₂	attainment
NO ₂	attainment
Ozone	attainment
CO	attainment
Lead	attainment

- (a) Volatile organic compounds (VOC) and oxides of nitrogen (NO_x) are precursors for the formation of ozone. Therefore, VOC emissions are considered when evaluating the rule applicability relating to the ozone standards. Marion County has been designated as attainment or unclassifiable for ozone. Therefore, VOC and NO_x emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.
- (b) Marion County has been classified as attainment or unclassifiable for PM-10, SO₂, NO₂, Ozone, CO, and Lead. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.
- (c) Fugitive Emissions
 Since this type of operation is not one of the 28 listed source categories under 326 IAC 2-2, 40 CFR 52.21, or 326 IAC 2-3 and since there are no applicable New Source Performance Standards that were in effect on August 7, 1980, the fugitive particulate matter (PM) and volatile organic compound (VOC) emissions are not counted toward determination of PSD and Emission Offset applicability.

Source Status

Pollutant	Emissions (ton/yr)
PM	0.9
PM10	0.9
SO ₂	0.5
VOC	0.6
CO	1.9
NO _x	24.4

- (a) This source is not a major stationary source because no attainment regulated pollutant is emitted at a rate of 250 tons per year or more, and it is not in one of the 28 listed source categories.
- (b) This source has nitrogen oxide(s) (NO_x) potential to emit of greater than ten (10) tons per year but less than twenty five (25) tons per year. Therefore, the source qualifies at

Registration status and is required to obtain a Registration pursuant to 326 IAC 2-5.1-2 Construction of New Sources; Registrations.

Part 70 Permit Determination

326 IAC 2-7 (Part 70 Permit Program)

This new source is not subject to the Part 70 Permit requirements because the potential to emit (PTE) of:

- (a) each criteria pollutant is less than 100 tons per year,
- (b) a single hazardous air pollutant (HAP) is less than 10 tons per year, and
- (c) any combination of HAPs is less than 25 tons/year.

This is the first air approval issued to this source.

Federal Rule Applicability

- (a) This electrical generating substation is not subject to the New Source Performance Standards (NSPS) as there are no applicable NSPS for reciprocating internal combustion generators.
- (b) This electrical generating substation is not subject to the National Emission Standards for Hazardous Air Pollutants (NESHAPs) as there are no applicable NESHAP for reciprocating internal combustion generators.

State and Local Rule Applicability - Entire Source

IAPCB Regulation 2 (Permits) and 326 IAC 2-5 (Registration Content)

Pursuant to IAPCB Regulation 2 (Permits) and 326 IAC 2-5.5-4 (Registration Content), an authorized individual shall provide a one-time notice to the Environmental Resources Management Division and the Office of Air Management that the source is in compliance with this registration pursuant to 326 IAC 2-5.5-4(a)(3). This registration will expire September 30, 2000.

326 IAC 2-2 (Prevention of Significant Deterioration (PSD) Requirements)

This source will install ten (10) temporary diesel generators. Potential to Emit any regulated pollutant has been determined to not be in excess of 250 tons per year (see TSD Appendix A, Page 3 of 5) based on 225 annual operating hours. Therefore, the PSD requirements do not apply to this source.

326 IAC 2-5.1-2 (Registrations)

This source will install ten (10) temporary diesel generators with integral hour limitations. Therefore, this source qualifies as Registration level pursuant 326 IAC 2-5.1-2 (Registrations). Potential to Emit NO_x has been determined to be within the thresholds of less than 25 tons per year and equal to, or greater than, 10 (ten) tons per year. The source is seeking a registration permit under 326 IAC 2-5.5.

IAPCB Regulation 2-6 (Annual emission statement rule) and 326 IAC 2-6 (Emission Reporting)

This source is subject to 326 IAC 2-6 (Emission Reporting), because it has the potential to

emit more than ten (10) tons per year of NO_x in Marion County. Pursuant to this rule, the owner/operator of the source must submit an annual emission statement for the source. The permit will be issued for a period of one (1) year. The annual statement must be received by April 15, 2001, and contain the minimum requirement as specified in 326 IAC 2-6-4. The submittal should cover the period defined in 326 IAC 2-6-2(8)(Emission Statement Operating Year).

326 IAC 2-7 (Part 70 Permit Program)

This source will install ten (10) temporary diesel. Potential to Emit any regulated pollutant has been determined to not be in excess of major source threshold (see TSD Appendix A, Page 3 of 5) based on 225 annual operating hours. Potential to emit HAP is also less than any major source threshold. Therefore, the Part 70 Program requirements do not apply to this source.

326 IAC 2-8 (Federally Enforceable State Operating Permit Program)

This source will install ten (10) temporary diesel generators. Potential to Emit any regulated pollutant has been determined to not be in excess of major source threshold (see TSD Appendix A, Page 3 of 5) based on 225 annual operating hours. Potential to emit HAP is also less than any major source threshold. Therefore, the Federally Enforceable State Operating Permit Program requirements do not apply to this source.

326 IAC 5-1 (Opacity Regulations)

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Exemptions), opacity shall meet the following, unless otherwise stated in this permit:

- (a) Opacity shall not exceed an average of thirty percent (30%) any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.
- (b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings) as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

State and Local Rule Applicability - Individual Facilities

326 IAC 6 (Particulate Rules)

The source consists of ten (10) temporary generators powered by reciprocating internal combustion engines combusting diesel fuel. Potential to emit PM is calculated to be less than ten (10) tons per year. Therefore, no PM limit for these units is established pursuant to 326 IAC 6-1 (Nonattainment Area Limitations) or 326 IAC 6-2 (Particulate Emission Limitations for Sources of Indirect Heating). Pursuant to 326 IAC 1-2-59 (Definitions), liquid and gaseous fuels and combustion air will not be considered as part of the process weight in determining applicability of 326 IAC 6-3 (Process Operations). Therefore, 326 IAC 6-3 (Process Operations) does not apply to liquid fuel fired generators at this source.

326 IAC 7 (Sulfur Dioxide Rules)

Neither the source nor any individual generator has potential to emit sulfur dioxide in excess of twenty five (25) tons per year. Therefore, 326 IAC 7 (Sulfur Dioxide Rules) does not apply.

326 IAC 8 (Volatile Organic Compounds)

The source wide VOC emissions are less than 25 tons per year. Therefore, 326 IAC 8-1-6 (New Facilities; General provisions relating to VOC rules: general reduction requirements for new facilities) does not apply to this source.

Air Toxic Emissions

Indiana presently requests applicants to provide information on emissions of the 188 hazardous air pollutants (HAPs) set out in the Clean Air Act Amendments of 1990. These pollutants are either carcinogenic or otherwise considered toxic and are commonly used by industries. They are listed as air toxics on the Office of Air Management (OAM) Construction Permit Application Form Y.

This new operation will emit levels of air toxics less than those which constitute a major source according to Section 112 of the 1990 Amendments to Clean Air Act.

An ISC model analysis was performed by IDEM and ERMD to determine the HAP concentrations. According to the preliminary hazard screening, the HAP concentrations were all well below their respective levels for one (1) in a million lifetime risk for developing cancer (see TSD Appendix A Page 5 of 5).

See spreadsheets (Appendix A, Page 4 of 5) for detailed air toxic calculations.

Conclusion

The operation of Indianapolis Power & Light Company (Brookwood Station) shall be subject to the conditions of the attached proposed Registration R097-12034-00385.

APPENDIX A

Portable Diesel Generators (>600 HP)
Five 750 kW Units Using Mfr's Emission Factors
Company Name: Indianapolis Power & Light (Brookwood Substation)
Address City IN Zip: 4625 Massachusetts Avenue, Indpls., IN
Permit #: R097-12034-00385
Reviewer: D. Foster
Date: 03/17/00

A. Comparison of AP-42 Emissions Factors and Mfr's Emission Factors.

	Pollutant					
	PM 0.1	PM10** 0.0573	SO2 0.1 (1.01S)	NOx 3.2	VOC 0.1	CO 0.85
AP-42 Emission Factor in lb/MMBtu						
AP-42 Emission Factor in lb/HP-hr*	2.54E-04	1.46E-04	1.28E-04	8.14E-03	2.29E-04	2.16E-03
Mfr's Emission Factors in lb/HP-hr	1.98E-04	1.98E-04 **not provided	4.05E-04	1.81E-02	5.07E-04	2.65E-04

* using AP-42 conversion factor of 2,542.5 Btu/HP

B. Emissions calculated based on Mfr's Data for 5 Units

Heat Input Capacity Potential Throughput S= 0.05 = WEIGHT % SULFUR
Horsepower (hp) hp-hr/yr

5150.0 1158750.0
1030*5=5150

	Pollutant					
	PM* 1.98E-04	PM10** 1.98E-04 **not provided	SO2 4.05E-04 (.00809S)	NOx* 1.81E-02	VOC* 5.07E-04	CO* 2.65E-04
Emission Factor in lb/HP-hr						
Potential Emission in tons/yr	0.1	0.1	0.2	10.5	0.3	0.2

*PM, NOx, VOC, and CO emission factors provided by manufacturer

Methodology

Potential Throughput (hp-hr/yr) = hp * 225 hr/yr

*No information was given regarding which method was used to determine the PM emission factor or whether condensable PM is included. The PM10 emission factor is filterable and condensable PM10 combined.

icdsl600.wk4 9/95

Portable Diesel Generators (>600 HP)

Five 1000 kW Units Using Mfr's Emission Factors

Company Name: Indianapolis Power & Light (Brookwood Substation)

Address City IN Zip: 4625 Massachusetts Avenue, Indpls., IN

Permit #: R097-12034-00385

Reviewer: D. Foster

Date: 03/17/00

A. Comparison of AP-42 Emissions Factors and Mfr's Emission Factors.

AP-42 Emission Factor in lb/MMBtu	Pollutant					
	PM 0.1	PM10** 0.0573	SO2 0.1 (1.01S)	NOx 3.2	VOC 0.1	CO 0.85
AP-42 Emission Factor in lb/HP-hr*	2.54E-04	1.46E-04	1.28E-04	8.14E-03	2.29E-04	2.16E-03
Mfr's Emission Factors in lb/HP-hr	1.10E-03	1.10E-03 **not provided	4.05E-04	1.83E-02	4.19E-04	2.25E-03

* using AP-42 conversion factor of 2,542.5 Btu/HP

B. Emissions calculated based on output rating (hp) For 5 Generators at 225 Hours Each

Heat Input Capacity
Horsepower (hp)

Potential Throughput
hp-hr/yr

S= 0.05 = WEIGHT % SULFUR

6703.5
1350*5=6750

1508287.5

Emission Factor in lb/hp-hr	Pollutant					
	PM* 1.10E-03	PM10** 1.10E-03 **not provided	SO2 0.0004 (.00809S)	NOx* 1.83E-02	VOC* 4.19E-04	CO* 2.25E-03
Potential Emission in tons/yr	0.8	0.8	0.3	13.8	0.3	1.7

*PM, NOx, VOC, and CO emission factors provided by manufacturer

Methodology

Potential Througput (hp-hr/yr) = hp * 225 hr/yr

*No information was given regarding which method was used to determine the PM emission factor or whether condensable PM is included. The PM10 emission factor is filterable and condensable PM10 combined.

Portable Diesel Generators (>600 HP)
Comparison of Emissions per Source's and AP-42
Company Name: Indianapolis Power & Light (Brookwood Substation)
Address City IN Zip: 4625 Massachusetts Avenue, Indpls., IN
Permit #: R097-12034-00385
Reviewer: D. Foster
Date: 03/17/00

Per IPL Data					AP-42 Conversions Factors		
Unit ID	Unit Size	Gal/hr	Btu/Gal	MMBtu/hr	HP/kW	Btu/HP	HP elect./HP mech.
750DFHA	1030 BHP	51.9	137,950	7.2	1.3407	2,542.5	0.9996
1000DFJD	1350 BHP	64.6	137,950	8.9	1.3407	2,542.5	0.9996

Emission Factors From IPL Conversion Factors from AP-42					Emission Factors from AP-42 Conversion Factors from AP-42				
Emission Factor in lb/BHP-hr	PM 1.98E-04	NOx 1.81E-02	VOC 5.07E-04	CO 2.65E-04	Emission Factor in lb/MMBtu	PM 0.10	NOx 3.20	VOC 0.10	CO 0.85
Unit ID	Emission totals for 5 engines of similar size				Unit ID	Emission Totals for 5 engines of similar size			
	PM tons/yr	NOx tons/yr	VOC tons/yr	CO tons/yr		PM tons/yr	Nox tons/yr	VOC tons/yr	CO tons/yr
750DFHA	0.11	10.49	0.29	0.15	750DFHA	0.32	10.22	0.29	2.72
1000DFJD	0.83	13.80	0.32	1.70	1000DFJD	0.43	13.63	0.38	3.62

Engines will be grouped in a set of five 750 DFHA plus a set five 1000DFJD for a total of ten engines at this substation.

Potential Throughput (hp-hr/yr) = hp * 225 hr/yr per each of the engines at this location.

Appendix A: Emission Calculations
Internal Combustion Engines - Diesel Fuel

Page 4 of 5 TSD App A

Portable Diesel Generators (>600 HP)

HAPs Emission Emission Calculations per AP-42

Company Name: Indianapolis Power & Light (Brookwood Substation)
Address City IN Zip: 4625 Massachusetts Avenue, Indpls., IN
Permit #: R097-12034-00385
Reviewer: D. Foster
Date: 03/17/00

ID	Gal/hr	MMBtu/hr	Hr/yr
750	51.9	7.2	225
900	54.6	7.5	0
1000	64.6	8.9	225
1250	74.5	10.3	0

HAP Emissions for Single Engine:

HAP	Emission Factor lbs/MMBtu	Lb/hr 750	Lb/hr 900	Lb/hr 1000	Lb/hr 1250
Acetaldehyde	2.52E-05	1.80E-04	1.90E-04	2.24E-04	2.59E-04
Acrolein	7.78E-06	5.57E-05	5.86E-05	6.93E-05	7.99E-05
Benzene	7.76E-04	5.55E-03	5.84E-03	6.91E-03	7.97E-03
Formaldehyde	7.89E-05	5.65E-04	5.94E-04	7.03E-04	8.11E-04
Naphthalene	1.30E-04	9.30E-04	9.79E-04	1.16E-03	1.34E-03
Toluene	2.81E-04	2.01E-03	2.12E-03	2.50E-03	2.89E-03
Xylenes	1.93E-04	1.38E-03	1.45E-03	1.72E-03	1.98E-03

Engine Identification		750	900	1000	1250		
Engines used at this Location		5	0	5	0		
HAP	Emission Factor lbs/MMBtu	Lb/hr 750	Lb/hr 900	Lb/hr 1000	Lb/hr 1250	Emissions Lb/hr	Emissions Ton/yr
Acetaldehyde	2.52E-05	0.0009	0.0000	0.0011	0.0000	0.0020	0.0002
Acrolein	7.78E-06	0.0003	0.0000	0.0003	0.0000	0.0006	0.0001
Benzene	7.76E-04	0.0278	0.0000	0.0346	0.0000	0.0623	0.0070
Formaldehyde	7.89E-05	0.0028	0.0000	0.0035	0.0000	0.0063	0.0007
Naphthalene	1.30E-04	0.0047	0.0000	0.0058	0.0000	0.0104	0.0012
Toluene	2.81E-04	0.0101	0.0000	0.0125	0.0000	0.0226	0.0025
Xylenes	1.93E-04	0.0069	0.0000	0.0086	0.0000	0.0155	0.0017
Total HAP Emissions:						0.1198	0.0135

Potential Throughput (hp-hr/yr) = hp * 225 hr/yr

Appendix A: Emission Calculations Internal Combustion Engines

Portable Diesel Generators (>600 HP)
Toxic Analysis Results for IPL Diesel Generators
Company Name: Indianapolis Power & Light (Brookwood Substation)
Address City IN Zip: 4625 Massachusetts Avenue, Indpls IN
Permit Number #: R097-12034-00385
Reviewer: D. Foster
Date: 3/17/00

HAP analysis of the 8-hour Threshold limit of 0.5% of the PEL

Pollutant (HAP)	Maximum Emission Rate g/s	Maximum Modeled Emission Rate g/s	Maximum Concentration ug/m3	.5% of PEL ug/m3	Exceeds Level
Acetaldehyde	0.0000378	0.00101	5.55	1800	No
Acrolein	0.0000126	0.0000126	0.0692	1.25	No
Benzene	0.00101	0.00101	5.55	16	No
Formaldehyde	0.000101	0.000101	0.555	4.65	No
Naphthalene	0.000164	0.00101	5.55	250	No
Toluene	0.000366	0.00101	5.55	3750	No
Xylenes	0.000252	0.00101	5.55	2175	No

Preliminary Hazard Screening*

Pollutant (HAP)	Maximum Modeled Emission Rate g/s	Maximum Annual Concentration ug/m3	1-In-Million Lifetime Risk Level ug/m3
Acetaldehyde	0.00101	0.59	0.5
Acrolein	0.0000126	0.0075	N/A
Benzene	0.00101	0.59	0.1
Formaldehyde	0.000101	0.059	0.08
Naphthalene	0.00101	0.59	N/A
Toluene	0.00101	0.59	N/A
Xylenes	0.00101	0.59	N/A

*EPA estimates that, if an individual were to breathe air containing one of the above HAPs over his or her entire lifetime, that person would theoretically have no more than a one-in-a-million increased chance of developing cancer as a direct result of breathing air containing this chemical. Maximum generator run time will be limited to 225 hours (10 days) per year for each unit.

Assumptions:

- Assumed worst case conditions.

- Ran 11 generators at the Cumberland Substation all running with the highest KW ratings (1250 KW). This provided the largest emission rate.
- Since benzene had the highest emission rate, this was used for five of the HAPs.
- For Acrolein and Formaldehyde, their 1250 KW emission rates were used.
- Downwash was taken into account.
- Used 1994 met year.
- The closest trailer to the fence line was 7 meters.
- Fence line receptor spacing was set at 10 meters.
- A total of 554 receptors were used.
- This combination of generators is overly conservative. The maximum number of 1250 KW units at anyone site is 4. Only one site will have 11 units with only 2 1250 KW units at that site.